Image and data processing of airborne geophysics for geological mapping and mineral exploration: Wopmay Orogen, N.T., Canada

Madeline Dana Lee[1,3], Bill Morris [1], Jeff Harris [2], and George Leblanc[3]

[1] McMaster University, Hamilton, Ontario
[2] Geological Survey of Canada
[3] National Research Council

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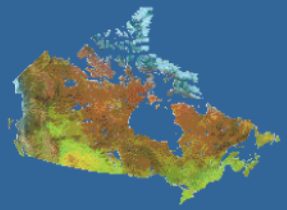
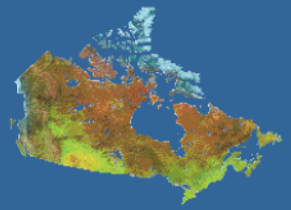
Project Overview

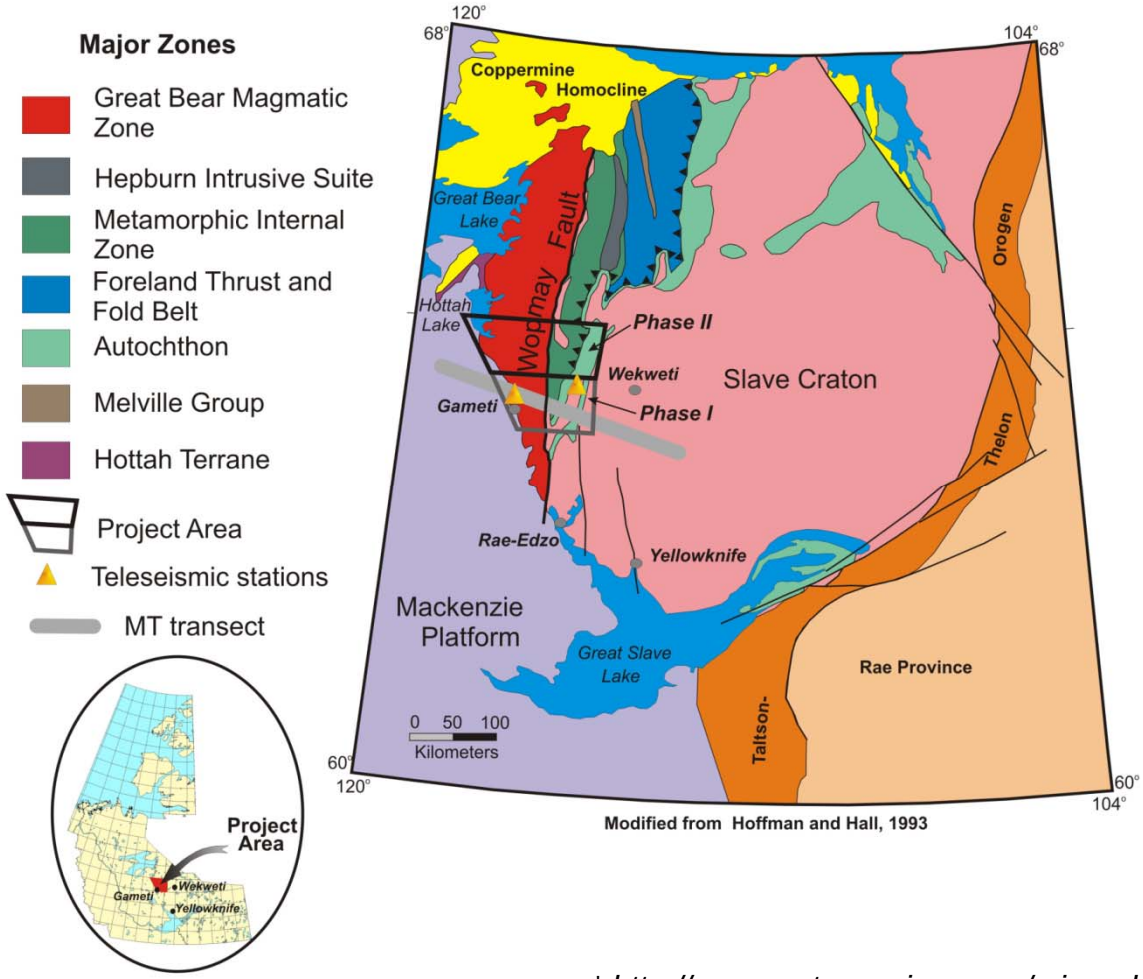


- Study contributes to **Geo-Mapping for Energy and Minerals (GEM)** Initiative
  - Remote Predictive Mapping (RPM)
  - Multiple-Metals

- Study area is the south **Wopmay Orogen**, Northwest Territories, Canada with specific attention to the Great Bear magmatic zone (GBmz)

Geological Overview

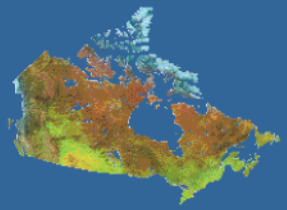


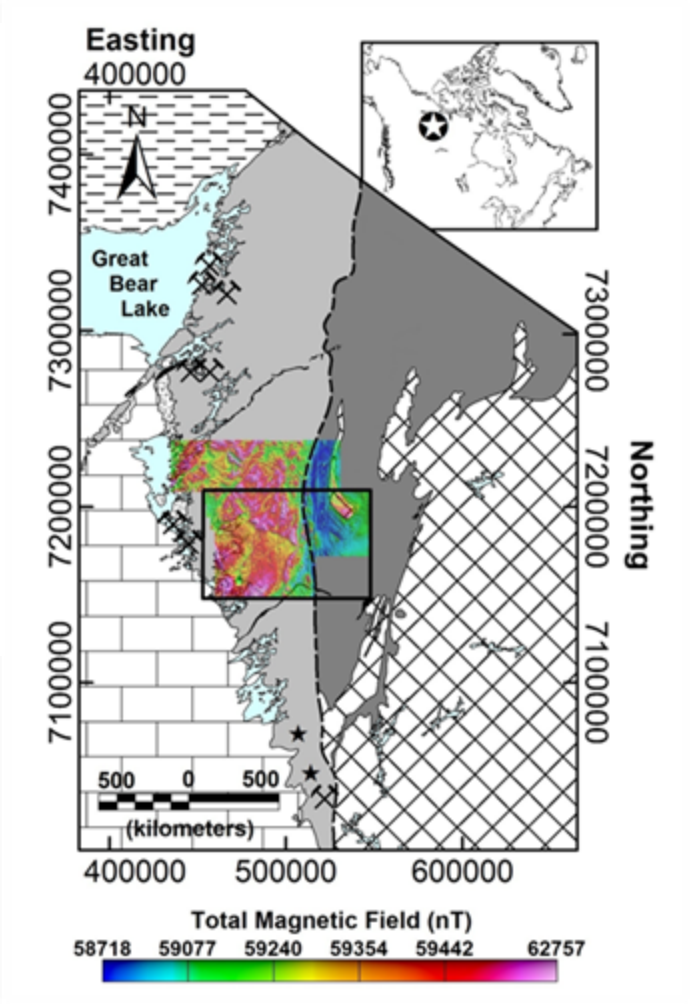


Modified from Hoffman and Hall, 1993

** http://www.nwtgeoscience.ca/minerals/southernwopmay.html*

Geological Overview





** Lee et. al (2012)*

Project Overview

- Due to limited surface exposure, an alternative method is required to image bedrock geology → **Geophysics** (i.e. Aeromagnetics)

Water bodies and vegetation

Extensive lichen

Glacial overburden

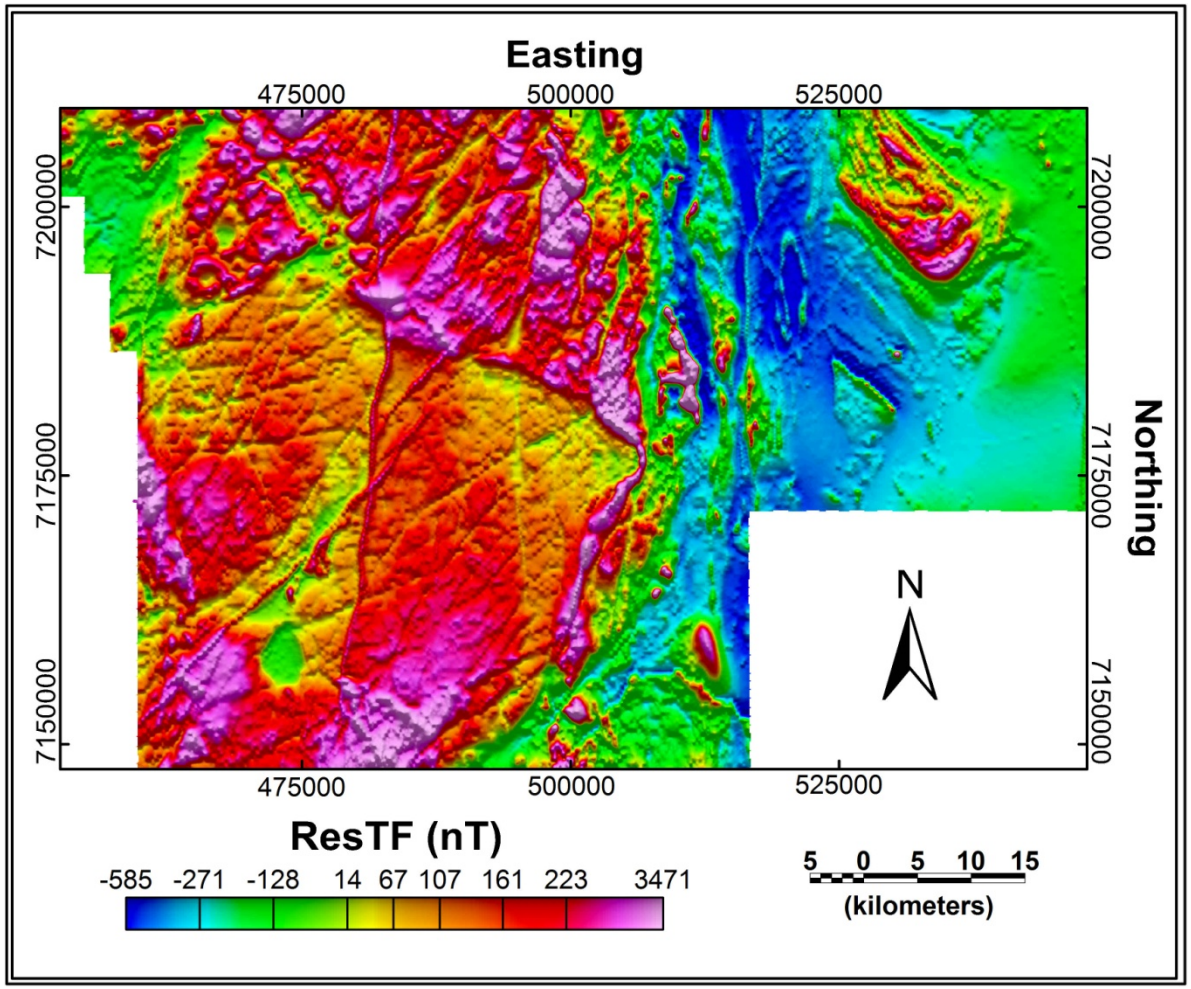
Project Overview

- **Primary objective:**

Delineate obscured lithological boundaries, structural information, and potential zones of mineralization through processed aeromagnetic data

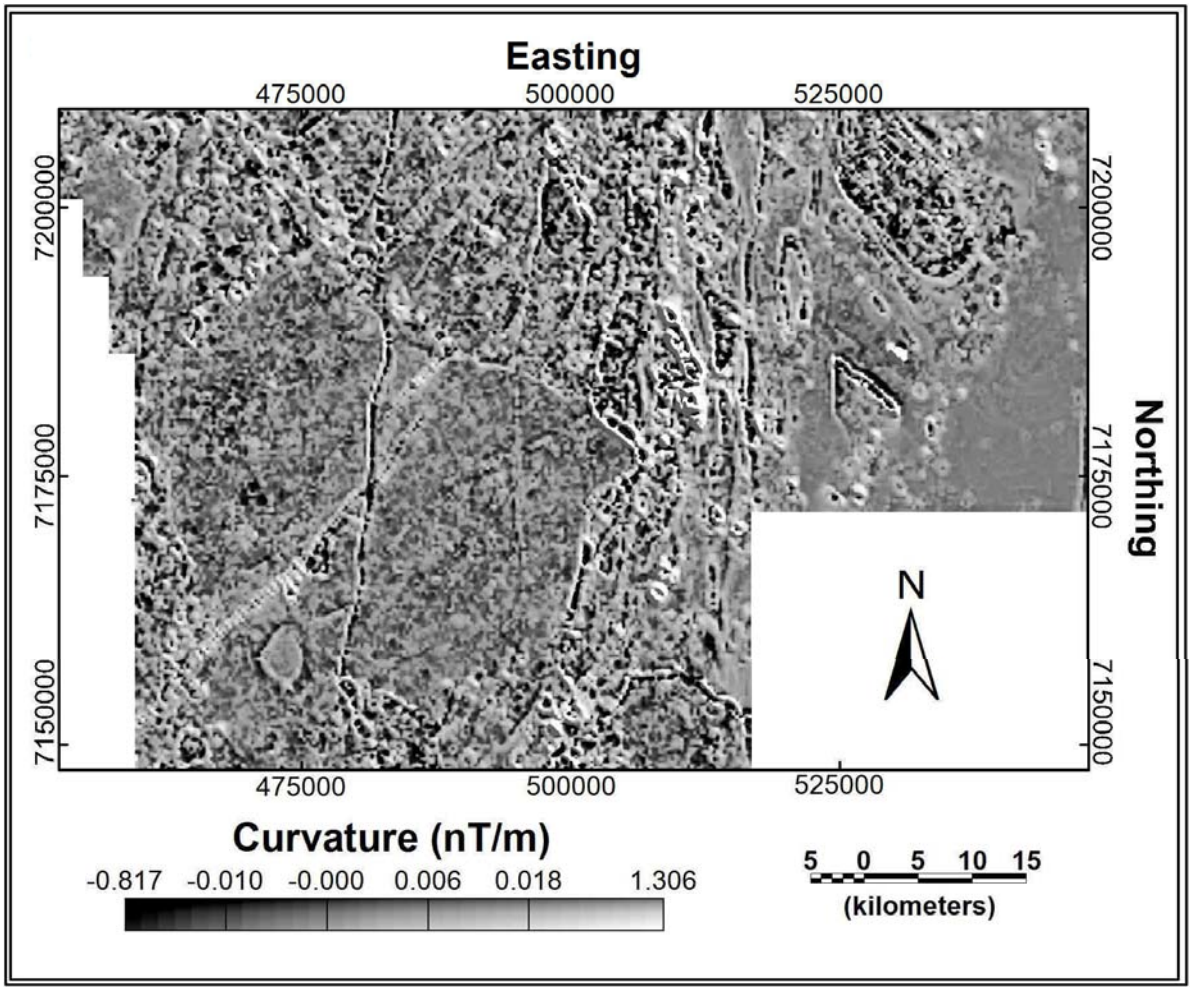
- **Curvature analysis**
  - Lineament analysis
  - Statistical analysis

Residual Magnetics

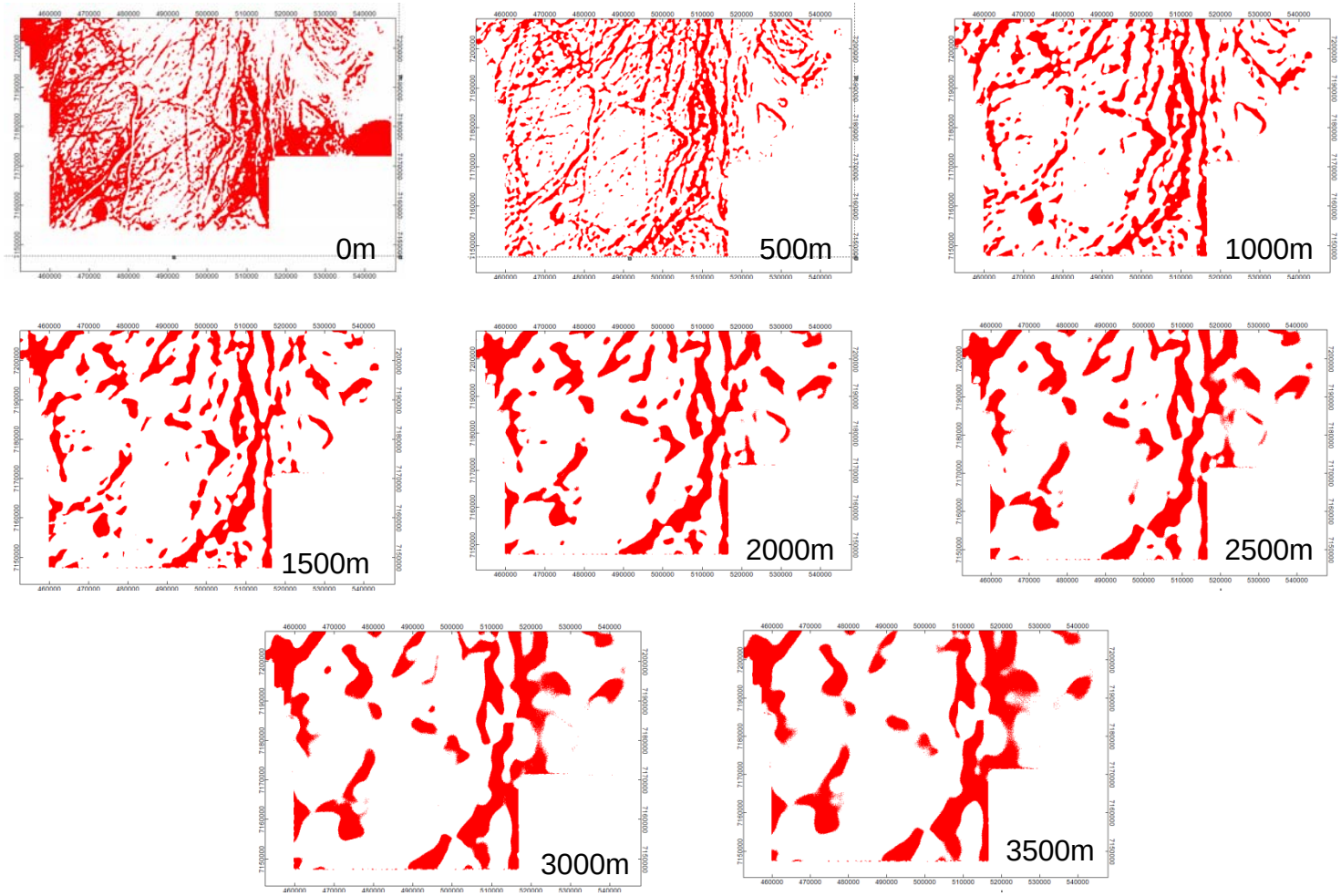


** Lee et. al (2012)*

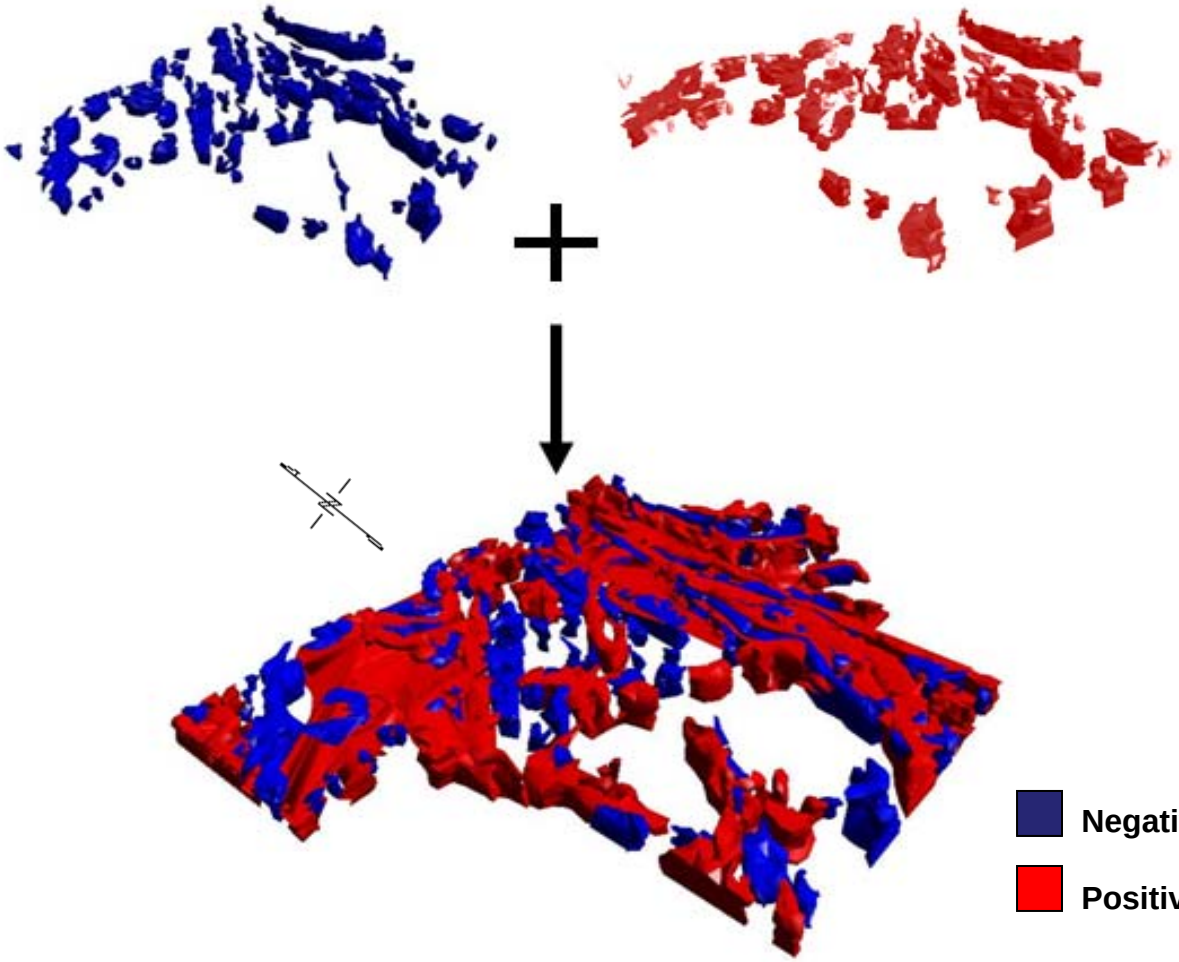
Surficial Curvature



Curvature Analysis



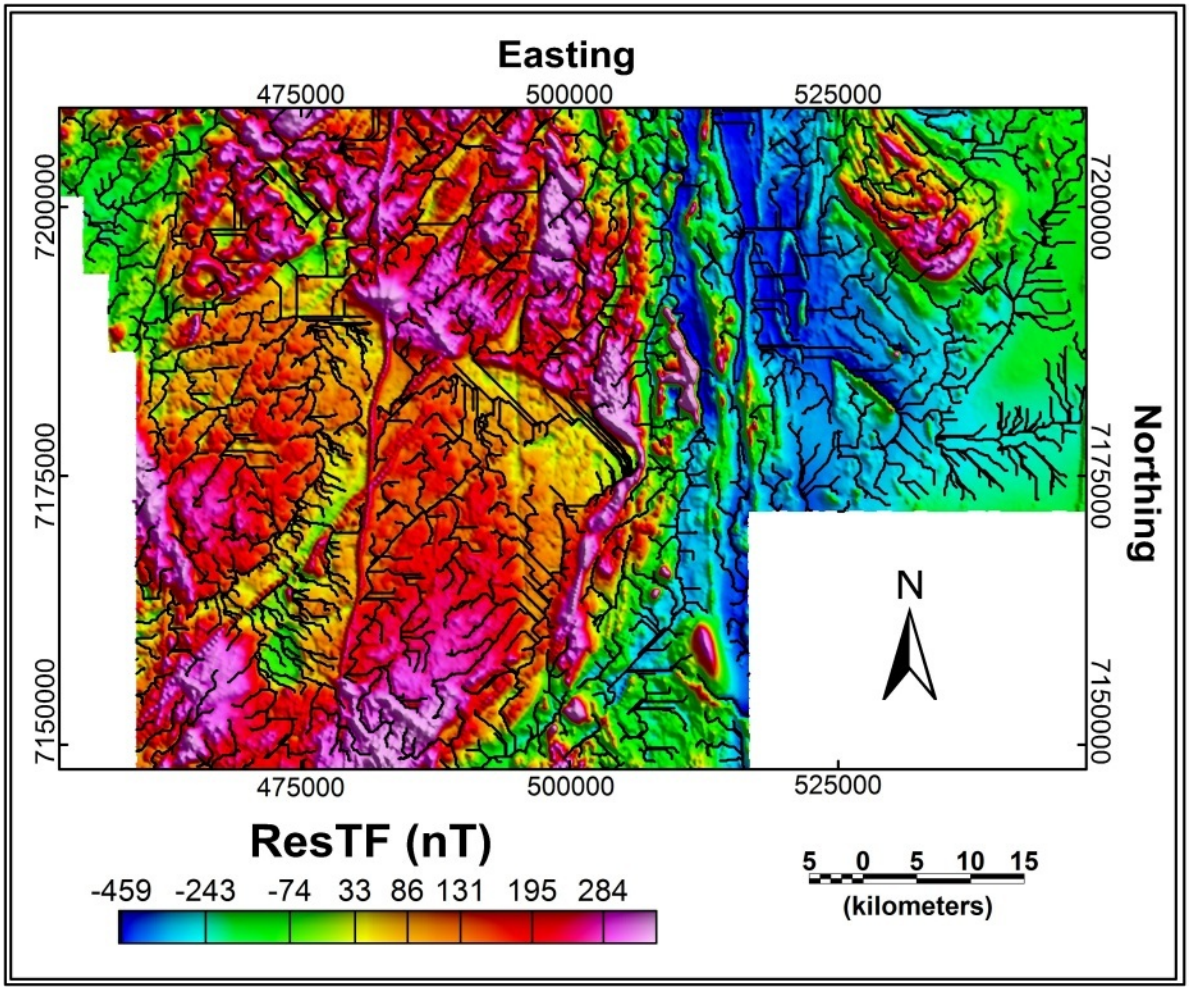
Curvature Analysis



Negative maximum curvature

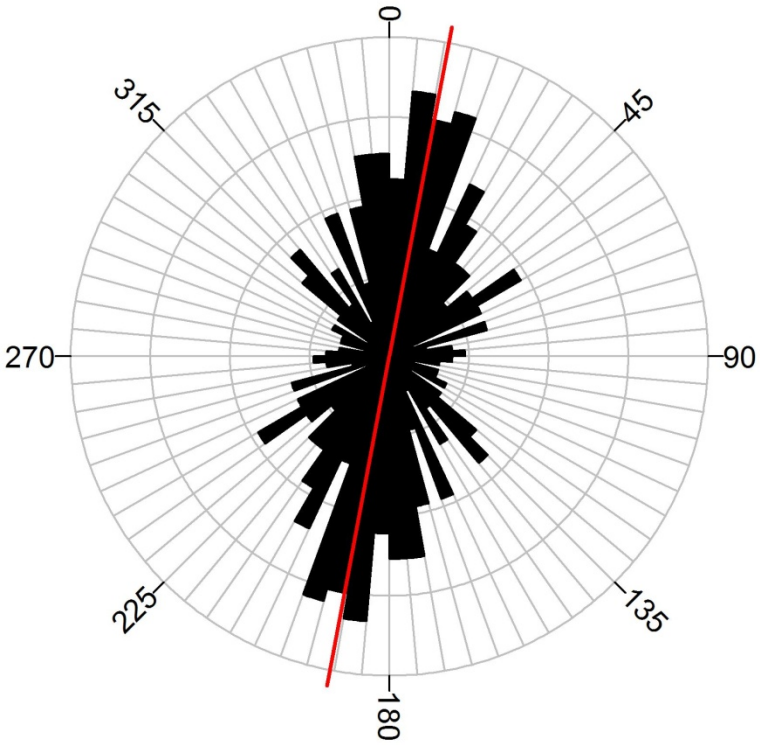
Positive maximum curvature

Lineaments

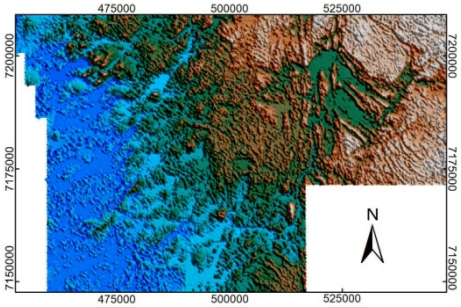


** Lee et. al (2012)*

Lineament Analysis



Synthesis



Topography

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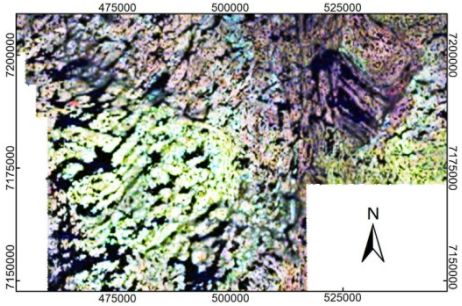

Radiometrics

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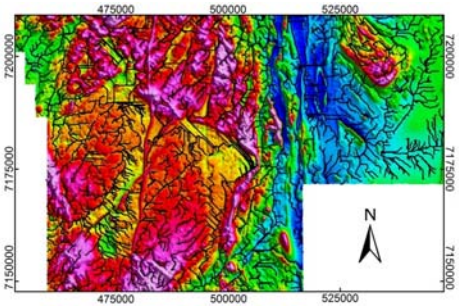
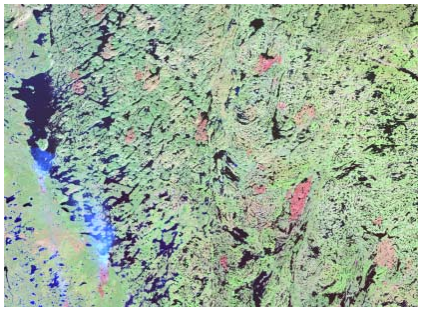


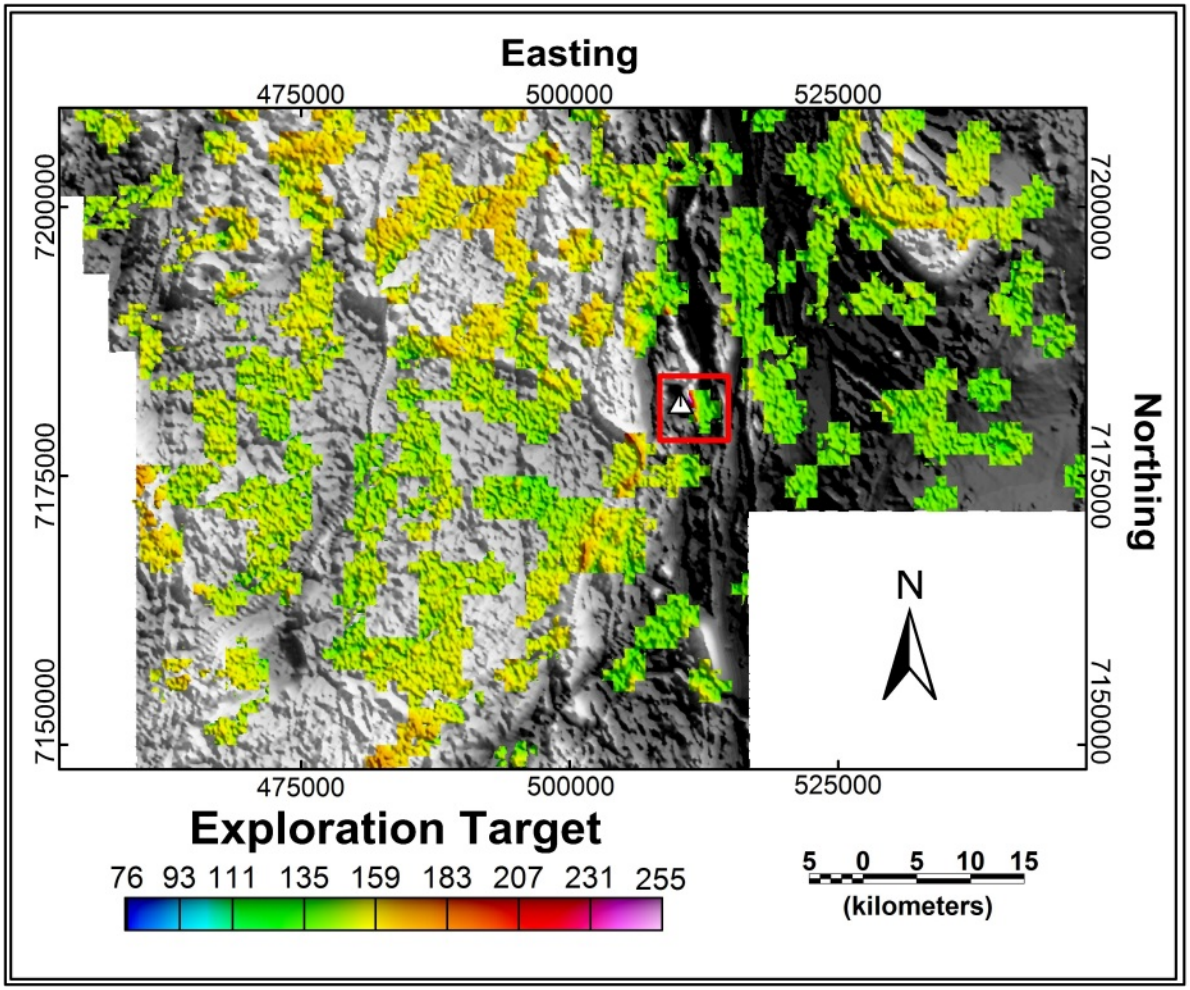
Lineaments

+



Satellite and Aerial Photographs

Synthesis



** Lee et. al (2012)*

Discussion

- A location in the Arctic or sub-Arctic may not host optimal conditions for traditional remote sensing (surficial). This requires alternative methods, in this case geophysics (subsurface).

- By analysing a magnetic surface (grid) we can identify faults, dykes, and lithological boundaries

- These results in conjunction with other geoscientific data allow the user to generate **RPM** and **MRA** products

Acknowledgements

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